

# **MIXED FRUIT CONCENTRATES AGAINST CONSTIPATION AND METHOD FOR PREPARATION THEREOF**

## **CROSS-REFERENCES TO RELATED APPLICATIONS**

This is patent application is the United States National Phase of PCT Application No. BR/05/0071 filed 5/4/2005 which claims priority to Brazil patent Application No. P10401302-6 filed 5/7/2004 both of which are incorporated herein by reference.

## **5 STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH AGREEMENT**

Not Applicable

## **THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT**

Not Applicable.

## **INCORPORATION BY REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC**

**10** Not Applicable

## **BACKGROUND OF THE INVENTION**

A process of manufacturing mixed fruit concentrates through the mixture of fruit which is cooked either using direct or indirect steam heating which has, special nutritional characteristics which meet the formulae of intestinal regulatory products, focused on meeting the needs of consumers with intestinal constipation and other gastrointestinal problems, giving its' attributes being a source of fiber and other nutrients, as such these products help in treatment of intestinal

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mucosa and in the regulation of the intestine.

Intestinal constipation, currently affects about twenty percent of the population. In adults women are more affected. This difference levels off in people over sixty years of age. The causes are diverse, ranging from modern lifestyle, including little ingestion of fiber and of liquids and little physical activity through use of medicine, hormone alterations, neurological and muscular pathology, psychiatric conditions and anatomical abnormalities of the large intestine. The synptomatology of intestinal constipation is widely varied in a person, as well as from one person to another, but it always has important repercussions such as: anxiety, indisposition, loss of appetite and mood change, abdominal distension, chronic headache and nausea and in some cases even fever.

#### 10 Description of the Related Art

Currently the following products are available in the market, with their respective classifications, characteristics, advantages and disadvantages.

Corporate names: Metamucil and Mucilium

Composition: Psyllium

15 Characteristic: Mass formers: They increase the faecal matter, facilitating its passage through the intestine. They are most often prescribed for long-term treatment over long periods, since have a physiological action.

Excessive use can provoke fecaloma.

Corporate names: Agiolax and Plantax

20 Composition: Seed of Plantago Ovatta

Characteristic: Mass formers: They increase the faecal matter, facilitating its passage through

the intestine. They are most often prescribed for long-term treatment as they have a physiological action.

Excessive use can provoke fecaloma.

Corporate name: Benefibre

5 Composition: Agar-Agar

Characteristic: Mass formers: They increase the faecal matter, facilitating its passage through the intestine. They are most often prescribed for long-term treatment as they have a physiological action.

Excessive use can provoke fecaloma.

10 Corporate name: Humectol-D

Composition: sodium picosulfate

Characteristic: Emollients and surfactants: They facilitate the water and fat mixture in the fecal mass, softening it.

They also stimulate the colonic secretion of water, sodium and chlorine.

15 Corporate name: Magnesia milk

Composition: Magnesia hydroxide

Characteristic: Osmotic laxative: This attracts water to the interior of the intestine since it is osmotically active.

It must be administered with caution, especially in people, due to the risk of hydroelectrolytic  
20 disequilibrium.

Corporate names: Lactulona, Farlac and Lactulose

Composition: Lactulose

Characteristic: Osmotic laxative: This attracts water to the interior of the intestine since it is osmotically active.

It must be administered with caution, especially in elderly people, due to the risk of hydroelectrolytic disequilibrium.

5 Corporate name: Glycerin (suppository/enema)

Composition: Glycerin

Characteristic: Osmotic laxative: This attracts water to the interior of the intestine since it is osmotically active.

10 It must be administered with caution, especially in elderly people, due to the risk of hydroelectrolytic disequilibrium.

Corporate names: Mineral oil, Purol and Agarol

Composition: Mineral oil

Characteristic: Lubricant: These are laxatives and they facilitate the movement of the faecal matter by lubricating the intestinal walls and diminishing water absorption.

15 They are not considered as good options for long periods, since they cause irritation of the anal canal and inhibit the absorption of fat-soluble vitamins (A, D, E, K).

Corporate names: Homeopatia 46, Agarol, Lactopurga and Purgoleite

Composition: Phenolphthalein

20 Characteristic: Stimulating and irritating agents: Two chemical groups are included: diphenylmetaminic derivatives and anthraquinonics. Both inhibit the absorption of water and electrolytes.

Their indiscriminate and prolonged use leads to the appearance of melanosis coli and reduces

motility due to nerve damage. It provokes what is known as Cathartic colon.

Corporate names: Oucolax and Humectol-O

Composition: Bisacodil

Characteristics: Stimulation and irritating agents: Two chemical groups are included:  
5 diphenylmetaminic derivatives and anthraquinonics. Both inhibit the  
absorption of water and electrolytes.

Their indiscriminate and prolonged use leads to the appearance of melanosis coli and reduces the  
motility due to nerve damage. It provokes what is known as Cathartic colon.

Corporate name: Guttalax

10 Composition: Sodium picosulfate

Characteristic: Stimulating and irritating agents: Two chemical groups are included:  
diphenylmetaminic derivatives and anthraquinonics. Both inhibit the  
absorption of water and electrolytes.

Their indiscriminate and prolonged use leads to the appearance of melanosis coli and reduces  
15 motility due to nerve damage. It provokes what is known as Cathartic colon.

Corporate names: Cáscará Sagrada, Ventre Livre and purgoleite

Composition: Cáscará Sagrada

Characteristic: Stimulating and irritating agents: Two chemical groups are included:  
20 diphenylmetaminic derivatives and anthraquinonics. Both inhibit the  
absorption of water and electrolytes.

Their indiscriminate and prolonged use leads to the appearance of melanosis coli and reduces  
motility due to nerve damage. It provokes what is known as Cathartic colon.

Corporate names: Agiolax, Plantax, Florax, Laxtan, Tamarine, Tamaril, Novolax, Tamarix, Frutalax, and Laxarine.

Composition: Senna

Characteristics: Stimulating and irritating agents: Two chemical groups are included: diphenylmetaminic derivatives and anthraquinonics. Both inhibit the absorption of water and electrolytes.

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Their indiscriminate and prolonged use leads to the appearance of melanosis coli and reduces motility due to nerve damage. It provokes what is known as Cathartic colon.

## BRIEF SUMMARY OF THE INVENTION

Object of the present invention is to overcome the inconveniences and limitations of the existing products, given the magnitude of this problem and the important repercussions that it can cause to the individual. Development is necessary of products or compounds containing fibers and other nutrients that assist in the treatment of the intestinal mucosa and promote the regularity of the intestine, but which do not cause additional damages, so to provide more freedom of use for a wider group of people, particularly at a time when many products sold under the label of “natural can cause serious damage for their irritating effects on the intestinal mucosae and intestinal motor neuron system. These factors means that they cannot be used in the long-term or under particular physiological condition, such as pregnancy and childhood.

Therefore, based on the herein cited objectives and numerous research projects, a mixture of cooked fruit has been developed, which has the capacity to promote the desired intestinal regulation. This mixture, which is rich in soluble fibers, contains a variety of vitamins and minerals, as well as other compounds composites that make it a functional food, that acts as a mass former because of the fiber content and as a stimulant because of the particular fruit, but without acting as an irritant.

### Advantageous Effects

The formulae of the intestinal regulator products of the present invention have a variety of advantages. As already stated they contain fibers, as well as vitamins and minerals, mainly carotene and vitamins of the B complex and other compounds such as bromelin, ficine and papain. They do not contain Senne, which is a stimulate and has an irritant effect on intestinal mucosae. They do not

cause adverse effects or any significant side effects, only a pleasant appearance and flavor. The products, either a puree or a mixture of cooked fruits, are composed of up to 7 (seven) fruits, where each one contributes its own particular properties to the product, as well as valuable soluble fibers. These fruits have been selected mainly for their known laxative effect and also for the absence of any composition which has an irritant effect on the intestinal mucosae. This makes it a product which can be used by a wide-range of people, from children to pregnant women. This kind of product is unique on the market.

The development of the present invention is based on the properties of the fruit that compose the mixture of the product:

Papaya, apart from its laxative properties, is rich in antirust (antioxidant) nutrients, such as carotene, vitamin C and flavonoids, which in turn help to protect and to treat the already infected intestinal mucosae. Also it contains good volumes of numerous minerals, especially potassium and magnesium and papain that is used in the combat of diverse problems, among them indigestion, mainly because of its proteolytic and anti-inflammatory action.

Pineapple is rich in vitamin C and potassium and contains bromelin, an enzyme similar to papain of the papaya. Bromelin was first used as a medicinal agent in 1957, and since then more than 200 published scientific papers have been published in medical literature on its therapeutic applications. Its benefits include: facilitating digestion through numerous processes, mainly for its proteolytic action; reducing inflammation and edemas; inhibiting plaquetary aggregation; controlling appetite and speeding up cicatrization and among other functions, reducing flatulence.

Apple provides high quantities of soluble fibers in pectin, which increases the volume of the faecal matter and improves the capacity of the intestinal muscle to push. It also contains elegiac,



clorogenic and caffeic acids, coadjutants in anticarcinogenic action. It also contains quercetin, a protective flavonoid which protects against cardiovascular illnesses, free radicals and carcinogenesis, besides acting as a gastric protector, as it increases the production of mucous in the stomach.

Plum is well known for its high laxative quality, besides offering good sources of carotene, flavonoids, potassium and iron.

Fig contains mainly minerals such as calcium, iron and potassium and its seeds also are an active and mild laxative which stimulate the muscles of the intestine. Added to these benefits, fig possess an enzyme called ficine that has proteolytic properties, which is widely employed in the pharmaceutical industry for its anti-helminthic action.

Apricot is rich in soluble fibers, betacarotene, potassium, iron and copper.

Therefore, after analyzing all of the data, it is reasonable to conclude that the composition of the mixed fruit concentrates has numerous benefits, mainly when dealing with the treatment of intestinal mucosae and the regulation of the intestine. It is suggested that the treatment of mucosa should be done mainly through the use of antioxidant vitamins, with scaring properties, as well as for other cited compounds, such as quercetin and bromelin. Whereas intestinal regularity is best achieved through the increase of the fiber consumption. This also influences appetite and brings weight loss.

In the research carried out for the attainment of the optimized formula, a series of formulae where tested, some are as follows:

1. **Children Intestinal Regulator–Prescription of Papaya, with Pineapple, Apple, Pear and Plum measures**

1200 g Papaya (without peel or seed)

330 g of apple (3 peeled small apples, without seed)

330 g of pear (3 peeled small pears, without seed)

300 g of plum

250 g of pineapple (without peel and core)

5 250 g of sugar or

175 ml of concentrated apple juice[[+]]

50 g of fructose

### **Sequence of Adopted Process**

10 Wash the plums and place them in a boiler (150ml water) to soften. The boiler must be covered. After twenty minutes, remove from the boiler and place in a pot together with the steamed water from the boiler, cover the pot and leave to cook, stirring regularly until the pulp is separated from the stone. Remove the stones and store the pulp in a cool place.

15 Wash, peel and remove the seeds and core of the other fruits. Cut fruits in small chunks and cook over an open fire in a covered pot till soft (that is when the apple and the pineapple can be easily perforated with a fork), take off the cover and boil until a half of the liquid has dried. Beat the boiled fruits together with the plum in a blender. Strain the pulp to remove the non- soluble fibers from the pineapple. Place in a pan, add sugar or concentrated apple juice, mix and heat until 28/32°Brix. When using concentrated apple juice add fructose then mix and heat no more one minute. Bottle.

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### **2. Day-to-Day Intestinal Regulator –Prescription of Papaya, pineapple, Apple, Dried Plum and Plum**

Measurements:

1200 g Papaya (without peel or seed)

400 g of pineapple (without peel and core)

330 g of apple (3 peeled small apples, without seed)

5 330 g of plum

66 g of black dried plum without seed

200 g of sugar or

175 ml of concentrated apple juice

50 g of fructose

10 **Sequence of Adopted Process**

Wash the plums together with the dried plums, place them in a covered boiler (150ml water).

After twenty minutes, remove from the boiler and place in a pot together with the steamed water from the boiler, cover the pot and leave to cook, stirring regularly until the pulp is separated from the stone. Remove the stones and store the pulp in a cool place.

15 Wash, peel and remove the seeds and core of the other fruits. Cut fruits in small chunks and cook over an open fire in a covered pot till soft (that is when the apple and the pineapple can be easily perforated with a fork), take off the cover and boil until a half of the liquid has dried. Beat the boiled fruits together with the plum in a blender. Strain the pulp to remove the non- soluble fibers from the pineapple. Place in a pan, add sugar or concentrated apple juice, mix and heat until  
20 28/32°Brix. When using concentrated apple juice add fructose then mix and heat no more one minute. Bottle.

3. **Day to Day Intestinal Regulator With Fig Prescription of Papaya, Pineapple, Apple, and Fig**

Measurements:

- 5           1200 g Papaya (without peel or seed)
- 600 g of figs (8 figs)
- 400 g of pineapple (without peel and core)
- 330 of apple (3 average apples peeled, without seed)
- 330 g of plum
- 10          200 g of sugar or
- 175 ml of concentrated apple juice
- 50g of fructose

**Sequence of Adopted Process**

15          Wash the plums and place them in a covered boiler (150ml water). After twenty minutes, remove from the boiler and place in a pot together with the steamed water from the boiler, cover the pot and leave to cook, stirring regularly until the pulp is separated from the stone. Remove the stones and store the pulp in a cool place.

20          Wash, peel and remove the seeds and core of the other fruits. Cut fruits in small chunks and cook over an open fire in a covered pot till soft (that is when the apple and the pineapple can be easily perforated with a fork), take off the cover and boil until a half of the liquid has dried. Beat the boiled fruits together with the plum in a blender. Strain the pulp to remove the non- soluble fibers from the pineapple. Place in a pan, add sugar or concentrated apple juice, mix and heat until

28/32°Brix. When using concentrated apple juice add fructose then mix and heat no more one minute. Bottle.

4. **Intestinal Regulator – Prescription of Papaya, Fig, Pineapple, Apple, Plum and Dried Plum**

5 Measurements:

1200 g papaya (without peel or seed)

600 g of figs (8 figs)

400 g of pineapple (without peel and core)

330 g of apple (3 average apples peeled, without seed)

10 330 g of plum

66 g of black dried plum without stone

200 g of sugar or

175 ml of concentrated apple juice

50 g of fructose

15 **Sequence of Adopted Process**

Wash the plums together with the dried plums, place them in a covered boiler (150ml water).

After twenty minutes, remove from the boiler and place in a pot together with the steamed water from the boiler, cover the pot and leave to cook, stirring regularly until the pulp is separated from the stone. Remove the stones and store the pulp in a cool place.

20 Wash, peel and remove the seeds and core of the other fruits. Cut fruits in small chunks and cook over an open fire in a covered pot till soft (that is when the apple and the pineapple can be

easily perforated with a fork), take off the cover and boil until a half of the liquid has dried. Beat the boiled fruits together with the plum in a blender. Strain the pulp to remove the non-soluble fibers from the pineapple. Place in a pan, add sugar or concentrated apple juice, mix and heat until 28/32°Brix. When using concentrated apple juice add fructose then mix and heat no more one minute. Bottle .

#### 5. **Intestinal regulator Plum Favor–Prescription of Papaya, Pineapple, Apple, Fig, Black Dried Plum and Plum**

Measurements:

1200 g papaya (without peel or seed)

600 g of figs (8 figs)

400 g of pineapple (without peel and core)

330 g of apple (3 peeled small apples, without seed)

250 g of plum

200 g of black dried plum without stone

85 g of sugar or

175 ml of concentrated apple juice

50 g of fructose

#### **Sequence of Adopted Process**

Wash the plums together with the dried plums, place them in a covered boiler (150ml water).

After twenty minutes, remove from the boiler and place in a pot together with the steamed water from the boiler, cover the pot and leave to cook, stirring regularly until the pulp is separated from the stone. Remove the stones and store the pulp in a cool place.

Wash, peel and remove the seeds and core of the other fruits. Cut fruits in small chunks and cook over an open fire in a covered pot till soft (that is when the apple and the pineapple can be easily perforated with a fork), take off the cover and boil until a half of the liquid has dried. Beat the boiled fruits together with the plum in a blender. Strain the pulp to remove the non- soluble fibers from the pineapple. Place in a pan, add sugar or concentrated apple juice, mix and heat until 28/32°Brix. When using concentrated apple juice add fructose then mix and heat no more one minute. Bottle.

6. **Intestinal Regulator with Apricot–Prescription of Papaya, Pineapple, Apple, Fig, Apricot, Black Dried Plum and Plum**

Measurements:

1200 g papaya (without peel or seed)

600 g of figs (8 figs)

400 g of pineapple (without peel and core)

330 g of apple (3 small apples, peeled without seed)

330 g of plum

66 g of black dry plum without stone

66 g of apricot

200 g of sugar or

175 ml of concentrated apple juice

50 g of fructose

### Sequence of Adopted Process

- Wash the plums and together with the apricot and dried plums, place them in a covered boiler (150ml water). After twenty minutes, remove from the boiler and place in a pot together with the steamed water from the boiler, cover the pot and leave to cook, stirring regularly until the pulp is separated from the stone. Remove the stones and store the pulp in a cool place. Wash, peel and remove the seeds and core of the other fruits. Cut fruits in small chunks and cook over an open fire in a covered pot till soft (that is when the apple and the pineapple can be easily perforated with a fork), take off the cover and boil until a half of the liquid has dried. Beat the boiled fruits together with the plum in a blender. Strain the pulp to remove the non- soluble fibers from the pineapple. Place in a pan, add sugar or concentrated apple juice, mix and heat until 28/32°Brix. When using concentrated apple juice add fructose then mix and heat no more one minute. Bottle.

### Comments on the Various Formulae:

1. The children version is sufficiently rich in papaya, providing together with the pear a mild laxative effect, while offering a pleasant flavor to children between 1 and 4 years of age.
2. The day-to-day version, without fig, is very mild and it is recommended either for sensitive people or for children between 4 and 6 years of age.
3. The version with fig and fresh plum without dried plum is a solution for when dried black plum makes the product too expensive.



4. The version with fig, plum and dried plum is the formula that obtained the best results and general acceptance. It is sufficiently effective without causing colic or any other undesirable reaction.

5. The plum version is for people who have better results with black plum.

6. The version with apricot is for people with serious intestinal constipation because the apricot when mixed with all the other fruits, besides creating a sophisticated and unusual taste, increases the laxative function.

After the research was concluded, the optimized formulation has the following compositions in weight, for adult use:

FRUIT	PERCENTAGE
Papaya (Formosa)	35 to 42
Fig	17 to 25
Pineapple	13 to 19
Apple	10.5 to 15
Plum	9 to 13
Dry Plum	0 to 7
Dry Apricot	0 to 4
Sugar	0 to 10
Concentrated apple juice	0 to 9
Fructose	0 to 7
Thickening agent	0.2 to 0.4
Acidulate agent	Qsp
Preservative agent	Qsp

The acidulate agent could be citric acid, tartaric acid, malic acid, fumaric acid, lemon juice or any other allowed by the legislation.

The thickening agent could be modified starch, guar gum, xantana, carragena gum, carboxymethylcellulose, Arabic gum, Jati gum– or others allowed by law.

5           The preservative agent could be ascorbic acid and its sodium salts, potassium and calcium, benzoic acid and its sodium salts, potassium and calcium or other allowed by law.

The justification for the chosen percentages is as follows:

10           The papaya cannot be very green or very ripe. When green it modifies the taste of the end product. When very ripe it makes the product very watery, modifying the consistency and loses a lot with peeling, making the correction factor very high, increasing the cost of the product. It is the fruit with a highest percentage in the formulation, therefore it functions basically as a vehicle for all the other components of the formulation, helping in the cooking of the fruit that are less watery and is available for the purchase throughout the year. When the percentage is increased the product becomes too watery and when lowered it loses efficiency.

15           The fig similar to the papaya cannot be too ripe nor green. When it is too green the taste of the product becomes unpleasant, and when too ripe, disintegrates during cooking, losing its laxative capacity. In lower percentages the product loses its effectiveness, mainly by reducing dramatically the fiber content. In larger amounts the product becomes commercially impracticable, due to the high cost of the fruit.

20           Pineapple when too green makes the product too acidic and unpalatable. In lower percentages it is difficult to process, since like the papaya it functions as a vehicle in the cooking process for the other fruit. In larger amounts some people have a low tolerance for pineapple some

people, mainly those who have gastric problems such as gastritis, esophagitis and sour stomach among others. In addition to all of these properties it is available throughout the year.

The best type of apple is “fuji”. When too green it causes the product to be unpalatably acidic.

5           An apple of a more acid nature is preferably used because of the natural pectin content which] also helps to solidify the mixed fruit concentrates. If used in less than the indicated amount, the ideal consistency would not be reached, and in greater amounts increases the pectin. This could cause the opposite effect provoking intestinal constipation. Moreover, the apple contributes a pleasant taste, neutralizing the acidity of the other fruit, and it is not an expensive fruit and is  
10       available throughout the year.

The plum, when too green adds high acidity to the product making it impracticable. The amount used is enough to act as a laxative, without increasing the cost of the product, since this fruit is not available in Brazil the whole year.

Besides its properties, the plum contributes a pleasant taste and compounded with the dried  
15       plum, which is very expensive, provides an important fiber content at a more reasonable price.

The dried plum is optional in the formulation. Although in small amounts, it represents comparative proportions to the other fruits in the same conditions. In larger amounts, it represents a higher ratio of fibers. Besides its properties, it is sweet and helps to neutralize the acidity of the other fruit and reduced the amount of sugar added to the product. Less then the indicated amount  
20       is not recommended since it is the minimum amount needed to guarantee the desired laxative effect.

Larger quantities are not used because of the amount of fibers. When there is a high fiber content, the user would have to include large quantities of liquids on a daily basis and most people

do not have this habit, thus the opposite effect would occur. Instead of being a laxative, mixed fruit concentrates could cause constipation. Apart from these arguments, dried plums is an expensive product, which is quoted in dollar, and depending on the quantity used, the product could become unfeasible.

5 Apricot is also optional in the formulation Although in small amounts for being in a dried state, when compared proportionally to the other fruit in the same conditions, it represents a large amount, principally as it relates to the ratio of fibers. Besides its properties, it contributed a sufficiently sophisticated and interesting taste to the product. Less than the indicated amount is not recommended because this is the minimum amount necessary to guarantee the desired effect to  
10 increase the faecal matter. On the other hand, larger amount are not recommended because the amount of fibers would also be greater and in this case the user would have to have large quantities of liquids daily. Since most people do not have this habit, instead of being a laxative, mixed fruit concentrates could have the opposite effect. Apart from these arguments, apricot is even more expensive than dried plum and depending on the quantity used, the product could become unfeasible.

15 Sugar or concentrated apple juice and fructose are in the range of its maximum amount. This is the ideal amount so that the mixed fruit concentrates become pleasantly edible and can be eaten by a spoon.

After the research was concluded, it was concluded that the optimized formula should contain the following compositions in weight. In the case of children use:

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FRUIT	PERCENTAGE
Papaya (Formosa)	41 to 47
Apple	11.5 to 12.5

Pear	11.5 to 14
Plum	11 to 14
Pineapple	9.5 to 10.5
Sugar	0 to 12
Concentrated apple juice	0 to 10
Fructose	0 to 8
Thickening agent	0.2 to 0.4
Acidulate agent	Qsp
Preservative agent	Qsp

The acidulate agent could be citric acid, tartaric acid, malic acids, fumaric acid, lemon juice or any other allowed by law.

The thickening agent could be modified starch, guar gum, xantana, carragena gum, carboxymethylcellulose, Arabic gum, Jati gum– or others allowed by law.

The preservative agent could be ascorbic acid and its sodium salts, potassium and calcium, benzoic acid and its sodium salts, potassium and calcium or other allowed by law.

The justification for the chosen percentages is a follows:

The papaya as in the previous formula cannot be too ripe nor too unripe for reasons already mentioned. The percentage is more than in the original formulae mainly to compensate for the percentages that are lower, for example, that of the pineapple. In lower percentages the product loses consistency and in higher percentages the product loses its efficiency.

The percentage of apple is increased mainly to increase the consistency of the mixed fruit concentrates which loses consistency due to the increase of the volume of papaya. However, this is the maximum amount recommended, otherwise the efficiency of the product will be affected due to the high content of pectin which has been added to the formula.

The pear when it's too green confers an unpleasant taste to the product and when it's too ripe becomes very watery, loses consistency and it does not help to give bind to the product, besides having its correction factor very high, it also increases the piece of the product. Because of its mild laxative property it provides less aggressive combination, mainly for children over two and under  
5 four years of age. Besides its properties, in this quantity the pear helps to neutralize the acidity of the other fruit, without increasing the price of the product and it's available throughout the year.

The percentage of plum is similar to that in the previous formula.

The pineapple has had a reduction in percentage to make the product more palatable for children between 2 to 4 years of age, however if reduced further, would cause the product to lose its  
10 properties.

The sugar or concentrated apple juice and fructose was also increased so that the flavor of the product would be more suitable for children.

## DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, FIG 1 has been attached with the block diagram of the process.

## DETAILED DESCRIPTION OF THE INVENTION

The manufacturing process of mixed fruit concentrates is given in the following sequence:

- 5 a) Clean and cut the pineapple in cubical pieces 3 to 4 cm and place them in boiler 1 with indirect water of vapor heating until soft (when the pieces of the pineapple can be easily perforated with a fork).
- b) Cook with water for 10 to 20 minutes, remove, then beat in a blender and strain to remove the fibers of the pineapple (the size of the strainer has holes that allow strawberry seeds to pass).
- 10 Transfer the pulp to boiler 3, together with the pulp of the other fruit.
- c) Wash the plums and remove the stones then place them together with the dried plum and the other washed, peeled, deseeded fruit that has to be cut in the size of cubical pieces of 3 to 4cm, with the exception of the fig which must be cut to remove only the stem.
- d) All these fruit must be cooked in water for approximately 20 to 30 minutes in boiler 2 with  
15 indirect water vapor heating, stirring constantly until soft or until the apple pieces can be easily perforated with a fork.
- e) When ready, remove from the heat and beat in the blender.
- f) Transfer this fruit pulp to boiler 3 with indirect water vapor heating with the pulp of the pineapple, adding sugar or concentrated apple juice and thickening agent until it reaches around 28  
20 to 36° Brix, mixing and heating between 90 to 95°C., adding acidulate agent, the necessary

preservative agents and finally fructose if apple juice concentrated was used. In this case, stop heating one minute after adding.

g) Bottle the product at this temperature and maintain this temperature for between 30 to 40 minutes in a bain-marie.

5 Alternatively, the plums could be pre-cooked in direct vapor, in a separate covered boiler till soft. After 15 minutes, they must be removed and placed in boiler with the water from the vapor. Cover the boiler in which the plums are being cooked, stirring constantly until the stone separate. Remove the stones and beat in the blender, then leave the pulp in a cool place. When the pulp of the other fruit is ready, transfer the pulp of the plums to boiler 3.

10 Alternatively, the pineapple could be cooked with all the fruit and in this case, all the fruit will be beaten together in the blender and must be then strained to remove the fibers of the pineapple.

Alternatively, sterilization could be complemented with gamma rays or any other type of radiation allowed by law, or an autoclave could be used.

## INDUSTRIAL APPLICABILITY

Whenever possible fresh fruit should be substituted with pulp. This is with the aim of simplifying production while also benefitting from control over the origin of the fruit (provision of certificates), and of reducing labor costs at the initial stage of production (washing and peeling).

5 Irrespective of the fruit being in it's fresh or in pulp form, the weighing and production process is basically the same as described. Normally we use pulp for papaya, apple and pineapple, while for fig and plums, the fresh form is preferred due to seasonally.

a) Wash the plums and remove the stone, wash, peel and cut the figs removing the stem, beat them in a blender.



b) Strain the pineapple to remove the fiber, transfer it to the boiler with the other fruit.

c) Mix and steam cook all the fruit in a boiler with vapor heating directly or indirectly, add sugar or concentrated apple juice, add thickening agent until it reaches 28° to 36° Brix, stirring constantly and keeping the temperature at between 90° to 95° C., add acidulate and preservative agents and finally fructose when apple juice concentrated was used. In this case, stop heating one minute after addition.

d) Bottle the product and place in bain-marie for 30 to 40 minutes or an autoclave can be used.